Near-Infrared Absolute Photometry of the Uranian Satellites

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We report the first absolutely-calibrated photometry of the Uranian satellites Miranda, Ariel, and Titania, in canonical near-infrared filters. These satellites were observed in July, August, and September of 1995, with the NSFCAM instrument at the NASA/IRTF. Results are reported for J, H, and K filters near 1.26, 1.62, and 2.21 μm, and two special $\sim$0.15-μm-wide filters placed at 1.73 and 2.27 μm. We measure an opposition surge for Miranda in the near-infrared of at least 0.48 mag/$^\circ$ between phase angles of 1.0° and 0.6°, compared to a much shallower 0.015 ± 0.006 mag/$^\circ$ surge reported by Buratti *et al.* (*Icarus* **84**, 203-214, 1990) for the visible. Miranda, which is brighter than Titania throughout the visible (Karkoschka *et al., Icarus* submitted), becomes the darker of the two satellites in the near- infrared, being some 20.5% dimmer than Titania in H, 8.8% dimmer in 1.73 μm, and 9.1% dimmer in K. All three satellites are brightest at 1.73 μm, with Ariel being fully 1/3 brighter than Miranda or Titania, whereas the three satellites are evenly spaced in albedo at 0.7 μm, in the visible (Ariel being 15% brighter than Miranda, which is in turn 15% brighter than Titania). Specifically, Ariel reaches a peak full disk albedo of 0.4161 ± 0.0125 for 1.0° phase at 1.73 μm. By comparison, the peak albedos of Miranda and Titania are only 0.2730 ± 0.0082 and 0.2969 ± 0.0089, respectively, at this wavelength (though these latter observations were at 2.4° phase). Continuing the trend seen in the visible, Ariel is the brightest of the Uranian satellites throughout the near-infrared. Finally, all three satellites show a distinct increase in full-disk albedo between H and 1.73 μm filters, on the order of 20%, which is the expected signature of water ice, in agreement with spectra taken by Brown and Cruikshank (*Icarus* **55**, 83-92, 1983).

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